

REMARKS

Applicants appreciate the Examiner's thorough review of the present application, and respectfully request reconsideration in light of the preceding amendments and the following remarks.

Claims 2-21 are pending in the application. Claim 21 has been amended to better define the claimed invention. No new matter has been introduced through the foregoing amendments.

The new ground of rejection relying on *Orita*, *Nakamura*, and *Matsuoka* are noted. Applicants respectfully traverse the rejection, because, like the previously applied and withdrawn *Toshiba*, *Matsuoka* fails to teach or suggest the claimed heat treatment process recited in step c') or independent claim 8 and step d) of independent claim 11.

It appears that the Examiner is simply looking for *any* heat treatment that appears to use the same atmosphere and temperature as the claimed heat treatment process, without taking into consideration (i) the *purpose* of the prior art heat treatment and (ii) the *order* in which the prior art heat treatment and other processing steps should be performed. By disregarding at least the above identified factors (i) and (ii), the Examiner has failed to follow the requirement that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. See *MPEP*, section 2141.03.VI quoting *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) (emphasis added).

Applicants respectfully submit that, for the reasons advanced herein below, a person of ordinary skill in the art, considering the teachings of *Matsuoka* as a whole including the above identified factors (i) and (ii), would *not* have been motivated to use the *Matsuoka* step (6) disclosed at column 6 lines 60-65 cited by the Examiner as a surface treatment in the process of *Orita/Nakamura*.

The *Matsuoka* heat treatment (disclosed in column 6, lines 60-64) is a heat treatment to 'convert' the 'amorphous and polycrystalline' GaN buffer layer into a single crystal. It is a sub-step in the *Matsuoka* process of GaN growing. See *Matsuoka* at column 6 line 23. Thus, the *Matsuoka* heat treatment is related to a heating process performed at the time of forming a GaN single crystal rather than a heat treatment which is performed after forming such GaN crystal.

Accordingly, a person of ordinary skill in the art, upon considering the *Matsuoka* reference as a whole, would understand that the *purpose* of the *Matsuoka* heat treatment (disclosed in column 6, lines 60-64) is to grow the GaN layer, and hence, the *Matsuoka* heat treatment corresponds at best to the step of growing the semiconductor layer 12 of *Orita*. See also *Exhibit A* submitted with the July 10, 2006 Response. Thus, the a person of ordinary skill in the art would have been motivated, *if at all*, only to modify the *Orita* step of growing the semiconductor layer 12 to include the *Matsuoka* GaN growing process. Such a modification would fail to teach or disclose the claimed heat treatment process which is performed on the already grown crystal film.

The person of ordinary skill in the art would also notice the *order* in which the *Matsuoka* heat treatment and other processing steps should be performed, i.e., the *Matsuoka* heat treatment must be performed at, not after, the time of growing the GaN crystal. In contrast, the heat treatment of step (c') or step (d) in claims 8 or 11, respectively, is performed after forming the un-doped GaN crystal film. More specifically, according to claims 8 and 11, the un-doped GaN crystal film is formed first (at step (b) of claims 8 and 11), and then the surface treatment process for removing the oxide film is performed (at step (c) of claims 8 and 11), and only then the surface treatment process at issue (at step (c') of claim 8 and (d) of claim 11) is performed. In other words, the un-doped GaN 'crystal' film has already been grown before the surface treatment process of step (c') in claim 8 or (d) in claim 11. Apparently, *Matsuoka* does not supply any suggestion or motivation to perform the heat treatment after the step of GaN crystal growing, contrary to the claimed feature argued above.

In summary, the *Matsuoka* heat treatment is a heating process performed during the step of

GaN growing so as to convert an amorphous and polycrystalline structure into a single crystal and is patentably distinguished from the claimed step (c') or (d) in claim 8 or 11, respectively, which is a heating process performed after the un-doped GaN crystal film has been grown so as to improve the surface condition of such grown GaN film. The purpose and process order of the *Matsukoa* heat treatment are completely different from those of the claimed surface treatment process, and therefore, *Matsukoa* is not combinable with *Orita* and *Nakamura* in the manner proposed by the Examiner, and any other possible combinations of the references would fail to teach or disclose the claimed steps (c') and (d) in claims 8 and 11, respectively.

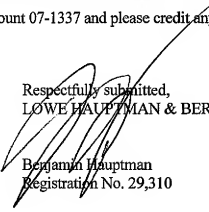
Accordingly, Applicants respectfully submit that claims 8 and 11, as well as their respective dependent claims, are not obvious over the currently applied art.

Each of the Examiner's rejections has been traversed. Accordingly, Applicants respectfully submit that all claims are now in condition for allowance. Early and favorable indication of allowance is courteously solicited.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
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